The documentation of product configuration systems: A framework and an IT solution

When designing and maintaining a product configuration system (PCS), complete and up-to-date documentation of the system is needed in the form of a product model that outlines the structures, attributes, and constraints of the PCS. Furthermore, up-to-date documentation for the PCS is crucial for maintenance, further development, system quality and communication with domain experts. Product models are the main communication and documentation tools used in PCS projects. Recent studies have shown that up-to-date documentation for the PCS is often lacking due to the significant amount of work required to maintain product models. To address these challenges, this paper proposes an approach for documenting the PCS that is based on the structure, attributes, and constraints modelled within the PCS, in which the product model is generated directly from the PCS. The suggested approach avoids knowledge duplication, as knowledge needs to be maintained within the PCS only. It involves two steps: the first is the building of the initial product model, which is used for the programming of the PCS. In the second step, the product model is generated directly from the PCS and is based on the structure, attributes, and constraints inside the PCS. The product model does not need to be maintained, therefore, outside the PCS. This approach meets the demand for agile documentation and efficient communication with domain experts, and uses the fewest resources possible. Furthermore, to support the framework, an IT documentation system is proposed that is capable of retrieving knowledge from the PCS and thus generating the product model. Our framework and IT documentation system were developed and tested at a case company on five different projects. The results confirm that benefits can be achieved by using the proposed IT documentation system, as time and resources are saved, while the quality of the PCS is improved.

General information
Publication status: Published
Organisations: Department of Management Engineering, Management Science, Operations Management, SolutionSpace ApS, University of Southern Denmark
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Pages: 163–175
Publication date: 2017
Peer-reviewed: Yes

Publication information
Journal: Advanced Engineering Informatics
Volume: 32
ISSN (Print): 1474-0346
Ratings:
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 4.15 SJR 1.167 SNIP 1.883
Web of Science (2017): Impact factor 3.358
Web of Science (2017): Indexed yes
Original language: English
Keywords: Product configuration system (PCS), IT documentation system, Product modelling, Agile framework
Electronic versions:
Revised_Manuscript_no_highlight.pdf. Embargo ended: 06/03/2019
DOIs: 10.1016/j.aei.2017.02.004
Source: PublicationPreSubmission
Source ID: 130208515
Research output: Contribution to journal › Journal article – Annual report year: 2017 › Research › peer-review